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IN RE DOLOR N. ADAMS AND DONALD L. FAUSER

No. 7591

United States Court of Customs and Patent Appeals

53 C.C.P.A. 1433; 364 F.2d 473; 1966 CCPA LEXIS 329; 150 U.S.P.Q. (BNA) 646

Oral argument February 8, 1966

August 4, 1966

PRIOR HISTORY: [*1]**

APPEAL from Patent Office, Serial No. 640,353

DISPOSITION:

Reversed.

COUNSEL:

Lawrence B. Biebel (Mario A. Martella, of counsel) for appellants.

Clarence W. Moore (Raymond E. Martin, of counsel) for the Commissioner of Patents.

OPINIONBY:

RICH

OPINION: [474]**

[*1433] Before RICH, Acting Chief Judge, and MARTIN, SMITH, and ALMOND, Jr., Associate Judges, and Judge WILLIAM H. KIRKPATRICK *

* United States Senior District Judge for the Eastern District of Pennsylvania, designated to participate in place of Chief Judge Worley, pursuant to provisions of Section 294(d), Title 28, United States Code.

RICH, Acting Chief Judge, delivered the opinion of the court:

This appeal is from the decision of the Patent Office Board of Appeals n1 affirming the rejection of claims 68-70 and 72-74 of application serial No. 640,353, filed February 15, 1957, entitled **[*1434]** "Electrophotographic Coating." Claims 57-67, 71 and 75 stand allowed.

n1 Examiners-in-Chief Duncombe and Lidoff, the latter writing the opinion, and Acting Examiner-in-Chief Wyman.

[*2]**

The invention is in the field of electrophotographic or electrostatic reproduction. The key to this process is the phenomenon of photoconductivity which is the property of some substances to be electrically nonconductive in the dark but to become electrically conductive when exposed to light. Such substances as listed in the application are "zinc oxide, titanium dioxide, zinc or cadmium sulfide, zinc selenide, and the like." The appealed claims are directed to a process of preparing an electrophotographic image carrier and processes of making it. Such an image carrier consists of a base

EXHIBIT A

member such as paper or sheet metal coated with a resinous polymeric binder which is electrically nonconductive - i.e. is a dielectric - in which is dispersed, in finely powdered form, the photoconductive material.

To make an image, the thus coated sheet is given a uniform electrostatic charge in the dark, is then exposed to a light image, as for example projecting an image thereon through a photographic transparency, and developed to produce a permanent visible image by applying to the sheet a positively charged powder which will cling to those areas of the sheet which retain the original negative **[***3]** charge, i.e. those areas which were not struck by light and thus rendered conductive so that the charge was removed. After application of the developing agent, the image is fixed by fusing it to the sheet by heat or spraying it with a clear lacquer, etc. **[**475]**

Exemplary of the process claims is claim 68 and of the product claims is claim 72 (all emphasis ours):

68. A process of preparing an electrophotographic image carrier comprising a base having thereon an electrically insulating photoconductive coating layer including finely divided solid photoconductor particles in an electrically insulating film-forming polymeric binder covering a substantial portion of at least one side thereof, comprising the steps of: providing an aqueous solution of an organic film-forming addition polymer of an ethylenically unsaturated monomer, said polymer having functional groups ionizable in an aqueous solution containing an electrolyte and wherein said functional groups comprise carboxyl groups, said solution containing a sufficient amount of a volatilizable neutralizing reactant to maintain said film-forming polymer soluble therein, uniformly dispersing in said aqueous solution particles **[***4]** of finely divided photoconductor material in an amount at least twice the amount by weight of said film-forming polymer to form a dispersion wherein the photoconductor material constitutes a dominant proportion by weight of the solids therein, applying said dispersion as a coating over a substantial portion of at least one side of a carrier base to provide a substantially uniform layer thereon, and drying said applied layer with substantial removal of said neutralizing reactant and evaporation of water to form said electrophotographic image carrier.

72. An electrophotographic image carrier comprising a base member having a layer thereon covering a substantial portion of at least one side thereof and forming a substantially non-hygroscopic photoconductive electrically insulating layer, said layer comprising: a synthetic organic film-forming addition polymer of an **[*1435]** ethylenically unsaturated monomer, wherein said polymer includes functional groups imparting aqueous solubility to said polymer, said functional groups being ionizable in an aqueous solvent containing an electrolyte and comprising carboxyl groups; and particles of finely divided photoconductor material uniformly **[***5]** dispersed in said polymer, said photoconductor material constituting a dominant proportion by weight of the solids in said layer and being present therein in at least two parts by weight to each part by weight of polymer, said polymer being present in a sufficient amount to bind said particles to said base, and said layer having a high electrical resistance in the absence of light.

The following references are of record and relied on:

Ball	2,287,161	June 23, 1942
Hayden	2,287,348	June 23, 1942
Niles	2,577,624	Dec. 4, 1951
McLaughlin	2,790,735	Apr. 30, 1957 (Filed Jan. 31, 1955)

The examiner said in his Answer, "Of the above references, only Niles is applied against the claims. The other references are retained only as showing the state of the art in the ensuing discussion."

The examiner thus stated his position in his Answer:

It is the Examiner's position here that, from a consideration of the reference applied against the claims [Niles], the claimed subject matter **[**476]** lacks novelty *(35 U.S.C. 102)* and/or unobviousness *(35 U.S.C. 103)* in the paper coating art.

If a claimed invention lacks novelty, we are unable to see that it is of **[***6]** any significance in what art it is old. It is not here contended that that which is old in one art can be repatented in another. We believe what the examiner had in mind was that obviousness is to be considered relative to the skill of those in the paper coating art generally rather than in the art of electrophotography specifically.

The board thus stated its position:

We * * * agree fully with the Examiner's position as expressed in his Answer in rejecting the appealed claims as unpatentable over Niles *(35 U.S.C. 102* and 103).

Since it agreed fully with the complete anticipation aspect of the rejection, to which it limited discussion, the board had nothing to say about the obviousness or section 103 aspect.

This case presents but one very specific issue for decision: does the Niles patent disclose to one skilled in the art a paper coating in which the mineral constituent is 100% titanium dioxide (TiO(2))? The position of the examiner, the board, and the solicitor rests on the proposition that it does and appellants' case is that it does not. We agree with appellant.

To elucidate the issue further, it will be noted from the claims that the invention, whether claimed [***7] as the electrophotographic image carrier or as the process for making it, comprises a coating on a base member, such as a sheet of paper, which coating is an initially water-soluble film-forming polymeric material in which the powdered photoconductor material is dispersed. As above stated, one [*1436] of appellants' broadly claimed "photoconductor materials" is titanium dioxide. n2 Niles shows a printing paper coating comprising the same binder that appellants claim, that not being disputed, a mineral component, and also the proportion limitations of the claims. Niles refers to titanium dioxide but in a particular way which has given rise to this controversy, as hereinafter explained.

n2 Hackh's Chemical Dictionary, 3d Ed., defines titanium dioxide as follows: TiO(2)=80.1. Titania. Colorless to black tetragonal or rhombic crystals, d.3.70-4.26, m. 1560; insoluble in water, soluble in alkalis or concentrated sulfuric acid. In its pure state it is used as a white pigment for paint, water colors, inks, shoe polish, soap, rubber goods and for ceramic glazes, and as a filler for paper.

[***8]

It is true, as appellants point out, that their invention is in the field of electrophotography and that their coated paper must have the insulating and photoconductive properties essential thereto, as required by the claims, while Niles' invention is printing paper for ordinary use in printing presses which need not have such properties. We do not overlook these facts and the potential issues related to them but our disposition of the case makes it unnecessary for us to discuss them further.

We agree with the solicitor's contention - and we believe appellants agree with it too - that in considering what the disclosure of Niles is, that is to say what it conveys to one skilled in the art, it is the man skilled in the paper coating art, rather than the electrophotographic art, who is involved since the Niles patent relates to printing papers and not to electrophotography. We will so judge the Niles disclosure. The Patent Office position is that Niles teaches an all-titanium-dioxide coating in appellants' water-soluble polymeric binder and if the same coating is produced it inherently has the same properties.

The Niles patent is entitled "Mineral-Coated Paper and Process of [***9] Producing Same." It is written, as are most patent specifications, with a broad statement of the field to which the invention relates, a couple of paragraphs about the prior art and its problems, an indication of the general nature of the invention, some objects, [**477] and then a detailed description of the invention with six specific examples. The invention is "a new binder for pigmented or mineralcoated papers, by the application of which, paper having improved characteristics is obtained." (This art seems to use the terms pigment and mineral coating interchangeably.) The invention "in particular relates to paper having high brightness, high gloss and good affinity for printing inks."

At the end of the first paragraph on the state and requirements of the known art Niles makes this statement which is at the heart of the controversy: [*1437] Commonly employed pigments are clay, calcium carbonate, blanc fixe, talc, titanium dioxide and the like. n3

n3 Believing that the only one of these terms which may be obscure to those not familiar with the art is "blanc fixe," we quote the definition thereof in Hackh's Chemical Dictionary, 3d Ed." Synthetic barium sulfate produced by the action of barium chloride on aluminum sulfate; used as a pigment for coating paper.

[***10]

That reference to titanium dioxide is the only one in the patent. The discussion then moves to a consideration of binders, what is wrong with them, and how Niles has improved them. There then follows this paragraph about the use of Niles' new binders:

The resinous compounds so obtained are suitably incorporated together with a pigment such as clay, talc, blanc fixe and the like in a medium such as water and applied to a coating raw stock by suitable means such as for example, by means of an air knife or roll coating coater.

Next is a discussion of the preparation of the binder, for a half column, and then the six specific examples of the coating of paper for printing in each of which the

same pigment or mineral is used. It is described simply as "A clay slip at 70% solids * * *." Hackh's Chemical Dictionary defines "slip" as "a fluid suspension of clay, fluxing material and water, used to coat ceramics before final heating; e.g., ZnO and clay, which gives a glaze." Webster's New International Dictionary, 2d Ed., gives as the most nearly appropriate definition, "Potter's clay in a liquid state, used in the casting process and for the decoration of ceramic ware, or as a cement **[***11]** for handles and other applied parts." The record contains various references to "clay slip" but we do not find a definition of the term in its relation to paper coating. However, it is clear that "slip" may contain ingredients other than clay and water in this art as is shown by a paper of record published by The Technical Association of the Pulp and Paper Industry, known as TAPPI Monograph No. 25, "Paper Coating Additives," wherein it is shown at page 53 that a "clay slip" contains as a dispersing agent "commercial sodium hexametaphosphate (Calgon)." Since Niles does not disclose the composition of the "clay slip," used in all of his examples, we are left to speculate as to just what it is.

Based on Niles' disclosure of using his new binder with "a pigment such as clay, blanc fixe and the like," exemplified only by the use of "A clay slip," plus his introductory reference to titanium dioxide as one of several named "commonly employed pigments" of the prior art, the Patent Office is insistent that the reference would be taken by one skilled in the paper coating art as disclosing the use of a paper coating consisting of Niles' binder and 100% titanium dioxide as the pigment. It **[***12]** says Niles discloses "that TiO(2) may be used as the pigment in lieu of the clay slip specifically set forth, **[*1438]** " to quote the solicitor's brief. This he thinks is "the reasonable meaning thereof to one of ordinary skill in the art." In the board's words:

> Niles clearly and unequivocally discloses titanium dioxide to be a commonly employed pigment in a class with and as an apparent full substitute for clay, blanc fixe and talc (column 1, lines 28-30). [Emphasis ours.] **[**478]**

The reference is to the passage we quoted above which contains the only reference to titanium dioxide in the Niles patent.

[1] On the other side, appellants say this is not what the patent would convey to one skilled in the art, that titanium dioxide is not in the class with clay, and that one skilled in the art would not substitute 100% TiO(2) in place of clay because it is not so used and those skilled in the art would not think that was what Niles meant or so read the Niles disclosure.They produce an affidavit from one who is skilled in this art, James V. Robinson, who has impressive qualifications in the field. He has an interest in the case in that he is employed by The Mead Corporation **[***13]** which has a license under the application at bar, but that is not unusual for affiants and does not disqualify him. The most relevant of his qualifications are:

> * * * for the past 17 years [I] have been employed in the Research Division of The Mead Corporation. Since 1950 I have been: Group Leader of the Fundamental Research Group of the Research Division; Research Consultant; Research Coordinator; Associate Director of Research; and recently I have been appointed a Fellow of the Research Department.I am a graduate of Pomona College and received my Doctor of Philosophy degree in Chemistry from the University of Illinois in 1940.
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> I am the co-author of the chapter entitled "Dispersants" appearing in TAPPI Monograph No. 25 entitled "Paper Coating Additives" published in 1963 by the Technical Association of the Pulp and Paper Industry, and I am the author of the chapter entitled "Dispersion of Pigments: Concept and Theory" to appear in a TAPPI Monograph soon to be released. In addition, I have published several papers dealing with theoretical physical chemistry.

Robinson's affidavit was filed at a time when the claims were being rejected on primary references no longer **[***14]** of record, and Niles and the McLaughlin patent were cited only as secondary references, some time after the final rejection and after appeal had been taken to the board. Robinson directed his affidavit to the Niles and McLaughlin disclosures. It was only after that that the examiner filed his Answer wherein, for the first time, he rejected the claims as fully met by Niles or obvious in view of Niles alone.

Robinson explains that titanium dioxide has a higher refractive index than any other white pigment and therefore possesses an unusually high opacifying and brightening effect when used in mineral coated papers, that it is a relatively expensive pigment, that its opacifying and brightening effect falls off as it is used in amounts above 10% of the total pigment and that the customary range to use is from 2% to 10%. Referring to McLaughlin's use of 20% TiO(2) **[*1439]** with 80% clay (kaolin) he said that was higher than the percentage normally used. He explained that it is undesirable to use more than is needed for whiteness because TiO(2) in printing papers produces a lack of smoothness and is excessively abrasive against printing plates, wherefore its excessive use is avoided **[***15]** for reasons of paper quality as well as reasons of economy. Speaking specifically of Niles, he said:

Referring to the Niles disclosure, there is no specific description of the amount of titanium dioxide used to produce the high brightness and high gloss mineral or pigmented coated printing paper. Each of the Examples of Niles discloses the use of a clay slip at 70% solids. Since the product being made is a paper sheet having high brightness, high gloss and good affinity for printing ink wherein the coating is deposited as a clay slip, it is clear to me from my knowledge and experience in the paper coating field that even if titanium dioxide were used, it would be used in combination with clay and would be present only in a minor proportion as needed to bring about the desired high brightness and **[**479]** opacity. I find no disclosure in Niles which indicates to me that titanium dioxide should be used in any amount beyond the customary small percentage and certainly there is no suggestion of use of titanium dioxide approaching 100% of the pigment, a procedure which would be contrary to the coating procedures commonly utilized to make a mineral coated printing paper.

I find **[***16]** no disclosure either in McLaughlin et al or Niles of the use of titanium dioxide with a binder wherein the titanium dioxide constitutes a dominant proportion by weight of the solids in the coatings. Thus, the coatings of McLaughlin et al and Niles, when prepared following the respective teachings of the patents and the procedures commonly employed in the paper coating industry, would not produce an electrically insulating photoconductive coating since the coatings of each patent are predominantly nonphotoconductive, clay being the principal component and titanium dioxide being present in a minor amount, if at all.

We find corroboration for what Robinson says in other matter of record including TAPPI Monographs, McLaughlin, and Ball. Monograph No. 20, "Paper Coating Pigments," p. 206, points to several kinds and grades of "titanium dioxide," which appears not to be a simple single thing, and says, "it should be remembered that they rarely form a major proportion of the coating mineral, since relatively small amounts are usually needed to produce opacity, brightness, and whiteness. * * * the remainder of the coating mineral, * * * may be clay, chalk, or some other 'extender' pigment **[***17]** * * *." On p. 207 it is stated, "titanium pigments usually form a relatively small portion of the mineral constituent, the balance being an extender pigment." The Ball patent says:

Mineral materials which are usually employed in paper coating processes comprise extenders having indices of refraction less than about 1.65, such as clay, satin white, calcium carbonate and barium sulfate, and/or various types of high strength pigments having indices of refraction greater than about 2.0, such as titanium oxide, zinc sulfide, zinc oxide, etc.

The solicitor asks us to read "titanium oxide" in that quotation as titanium dioxide.We do, as Ball does later on. ("Satin white, **[*1440]** " according to Hackh, is a mixture of calcium sulfate and aluminum hydroxide and this is essentially confirmed by a TAPPI Monograph.) Ball continues:

Said clay, satin white, calcium carbonate, barium sulfate, etc., extenders are relatively cheap and are widely employed, particularly in the manufacture of coated paper. * * * High strength pigments, such as mentioned, produce coated, surface-pigmented papers possessing relatively high opacity and brightness. In most instances, however, their excessive **[***18]** cost renders use of such pigments for the purpose prohibitive. It has been been proposed to employ extended forms of these pigments, utilizing such extenders as those mentioned * * *.

Both sides place some reliance on those statements by Ball.

The Patent Office urges in support of its theory that Niles teaches 100% titanium dioxide as pigment in printing paper coating, which is the only kind of paper Niles discusses, some admittedly "uncommon" situations shown in the record where a major proportion or even as much as 100% titanium dioxide may be used. Both of these uses are mentioned in TAPPI Monograph No. 20 at p. 221. One is the coating of opaque waxing stock in making waxed paper where it says "titanium dioxide may constitute the major component of the coating mineral." The other is in making wallpaper. In this use it is stated that titanium pigments "When used in the ground coat, * * * usually form from 5 to 15% of the mineral constituent, expressed as titanium dioxide but, when used in the mixes for top colors and highlights, as much as 100% may be used to secure effective **[**480]** covering and contrast." The preceding two paragraphs of this same paper state, however, **[***19]** that "In printing papers" the amount of titanium pigments is "generally from 5 to 20% of titanium dioxide * * *." In "paperboards of all types" they "will generally be in the neighborhood of from 10% to 25% titanium dioxide * * *."

We are not skilled in the paper coating art. Yet we must determine what meaning Niles conveys to such a person. To that end we necessarily look to the evidence supplied to us, generally surveyed above, rather than to our own inner consciousness. On the basis of that evidence, it does not seem to us that one familiar with the facts of paper coating would combine with Niles' disclosure the facts that in making waxed paper or printing wallpaper highlights a high percentage, even 100%, of titanium dioxide is used and assume that Niles would or intended to do the same in making printing paper. We believe the contrary would be the case in view

of the common practices in coating printing paper. In describing his own invention Niles does not indicate in any way that he uses any titanium dioxide at all. It is interesting to note that Robinson seems to assume, as an expert, that Niles may have the usual small percentage of TiO(2) in his "clay slip" because **[***20]** Niles refers to his printing papers as of "high brightness," and that seems probable. But even this must be left to surmise. From what we have been able to **[*1441]** see of the situation in the art, and surely it is relatively little, the Patent Office contention appears to fly in the face of reason and to rest on a mere playing with phrases, excised from their context to support a thesis without regard to the general picture. It is clear that the normal practices involve the use of less than about 20% of titanium dioxide in printing and most other papers and this is quite enough to justify Niles' solitary statement about titanium dioxide, that it is "commonly employed" as a pigment. So it is. He never elaborated on how it was used and he did not expressly suggest using it at all in practicing his own invention. It is too much to make of this disclosure a teaching of a printing paper coated even with a dominant portion of TiO(2), and certainly not 100%, instead of clay.

This is decisive of the issue for it is not in dispute that unless a paper coating contains at least a dominant portion of titanium dioxide it will not meet the appealed claims and will not be photoconductive. **[***21]**

There is another major argument in the case about the use of dispersants in coatings containing titanium dioxide and the common practice of the suppliers of titanium dioxide in adding dispersants to water soluble grades, the point being that their presence would destroy the electrophotographic value of the coating because of the conductivity of ionic dispersants used with titanium dioxide. The McLaughlin patent's eight examples all employ such dispersant in a pigment portion consisting of 80% clay, 20% TiO(2), and 0.2% sodium hexametaphosphate. We find it unnecessary to reach this technical question, merely noting that it has not been overlooked.

We are unable to see any real distinction here between the rejection based on section 102 and the rejection on section 103. If Niles does not disclose a printing paper coating with 100% or at least a dominant portion of TiO(2), neither does he suggest it so as to make obvious that which is not disclosed. The two rejections, resting as they do on the same foundation, fall together when that foundation is removed.

The decision of the board as to all appealed claims is reversed.